WHAT IS CLAIMED IS:

1. A method for determining an input operating point and an output operating point on a non-linear traveling wave tube amplifier (TWTA), comprising:

measuring non-linearity of the TWTA;

computing an input root-mean-square (RMS) value of an input signal used to measure the non-linearity of the TWTA, wherein the input RMS value identifies an input operating point of the measured non-linearity of the TWTA; and

obtaining an output operating point.

2. The method of claim 1, wherein the measuring the non-linearity of the TWTA comprises measuring the non-linearity at a local receiver.

3. The method of claim 1, wherein the measuring the non-linearity of the TWTA comprises measuring the non-linearity at a broadcast center.

4. The method of claim 3, further comprising downloading the measured non-linearity and the output operating point to an individual receiver.

5. The method of claim 1, wherein obtaining the output operating point comprises calculating an output RMS value of output signals used in measuring the non-linearity of the TWTA.

6. The method of claim 1, wherein obtaining the output operating point comprises obtaining a corresponding point on the measured TWTA non-linearity based on the input RMS value.

7. The method of claim 1, further comprising reconstructing an upper layer signal of a layered modulation based on the output operating point.

AMENDED SHEET

8. The method of claim 1, further comprising offsetting the measured non-linearity to provide referenced operating point values.

9. The method of claim 8, wherein the offsetting comprises scaling an input amplitude value and output amplitude value of the measured non-linearity of the TWTA to place the input and output operating points at desired points.

10. The method of claim 9, wherein the scaling comprises subtracting a measured input operating point value from all input values in a log domain.

11. The method of claim 9, wherein the scaling comprises subtracting a measured output operating point value from all output values in a log domain.

12. The method of claim 9, wherein the scaling comprises subtracting a measured phase value at the output operating point from phase values of all output points used to measure the non-linearity of the TWTA.

13. The method of claim 9, wherein the scaling further comprises:

placing bounding points beyond end points used to measure the non-linearity; and

interpolating output testing data that falls outside of the measured non-linearity based on the bounding points.

14. The method of claim 8, further comprising mapping the input operating point and output operating point to a particular level to avoid signal saturation or fractional value representation overflow.

AMENDED SHEET

15. An apparatus for determining an input operating point and an output operating point on a non-linear traveling wave tube amplifier (TWTA), comprising:

means for measuring a non-linearity of the TWTA;

means for computing an input root-mean-square (RMS) value of an input signal used to measure the non-linearity of the TWTA, wherein the input RMS value identifies an input operating point of the measured non-linearity of the TWTA; and

means for obtaining an output operating point.

16. The apparatus of claim 15, wherein the means for measuring the non-linearity of the TWTA comprises means for measuring the non-linearity at a local receiver.

17. The apparatus of claim 15, wherein the means for measuring the non-linearity of the TWTA comprises means for measuring the non-linearity at a broadcast center.

18. The apparatus of claim 17, further comprising means for downloading the measured non-linearity and the output operating point to an individual receiver.

19. The apparatus of claim 15, wherein the means for obtaining the output operating point comprises means for calculating an output RMS value of output signals used in measuring the non-linearity of the TWTA.

20. The apparatus of claim 15, wherein the means for obtaining the output operating point comprises means for obtaining a corresponding point on the measured TWTA non-linearity based on the input RMS value.

AMENDED SHEET

21. The apparatus of claim 15, further comprising means for reconstructing an upper layer signal of a layered modulation based on the output operating point.

22. The apparatus of claim 15, further comprising means for offsetting the measured non-linearity to provide referenced operating point values.

23. The apparatus of claim 22, wherein the means for offsetting comprises means for scaling an input amplitude value and output amplitude value of the measured non-linearity of the TWTA to place the input and output operating point at desired points.

24. The apparatus of claim 23, wherein the means for scaling comprises means for subtracting a measured input operating point value from all input values in a log domain.

25. The apparatus of claim 23, wherein the means for scaling comprises means for subtracting a measured output operating point value from all output values in a log domain.

26. The apparatus of claim 23, wherein the means for scaling comprises means for subtracting a measured phase value at the output operating point from phase values of all output points used to measure the non-linearity of the TWTA.

27. The apparatus of claim 23, wherein the means for scaling further comprises:

means for placing bounding points beyond end points used to measure the non-linearity; and

means for interpolating output testing data that falls outside of the measured non-linearity based on the bounding points.

28. The apparatus of claim 22, further comprising means for mapping the input operating point and output operating point to a particular level to avoid signal saturation or fractional value representation overflow.

29. A system for determining an input operating point and an output operating point on a non-linear traveling wave tube amplifier (TWTA), comprising:

(a) a measuring module configured to:

(1) measure non-linearity of the TWTA; and

(2) obtaining an output operating point; and

(b) a non-linear distortion map module configured to compute an input root-mean-square (RMS) value of an input signal used to measure the non-linearity of the TWTA, wherein the RMS value identifies an input operating point of the measured non-linearity of the TWTA.

30. The system of claim 29, wherein the measuring module is located at a local receiver.

31. The system of claim 29, wherein the measuring module is located at a broadcast center.

32. The system of claim 31, further comprising a receiver configured to download the measured non-linearity and the output operating point.

33. The system of claim 29, wherein the measuring module is configured to obtain the output operating point by calculating an output RMS value of output signals used in measuring the non-linearity of the TWTA.

34. The system of claim 29, wherein the measuring module is configured to obtain the output operating point by obtaining a corresponding point on the measured TWTA non-linearity based on the input RMS value.

35. The system of claim 29, further comprising a receiver configured to reconstruct an upper layer signal of a layered modulation based on the output operating point.

36. The system of claim 29, further comprising a receiver configured to offset the measured non-linearity to provide referenced operating point values.

37. The system of claim 36, wherein the receiver is configured to offset the measured non-linearity by scaling an input amplitude value and output amplitude value of the measured non-linearity of the TWTA to place the input and output operating point at desired points.

38. The system of claim 37, wherein the receiver is configured to scale by subtracting a measured input operating point value from all input values in a log domain.

39. The system of claim 37, wherein the receiver is configured to scale by subtracting a measured output operating point value from all output values in a log domain.

40. The system of claim 37, wherein the receiver is configured to scale by subtracting a measured phase value at the output operating point from phase values of all output points used to measure the non-linearity of the TWTA.

41. The system of claim 37, wherein the receiver is further configured to scale by:

placing bounding points beyond end points used to measure the non-linearity; and

interpolating output testing data that falls outside of the measured non-linearity based on the bounding points.

42. The system of claim 36, wherein the receiver is further configured to map the input operating point and output operating point to a particular level to avoid signal saturation or fractional value representation overflow.

43. The method of claim 2, wherein the step of measuring the non-linearity of the TWTA comprises:

generating a difference between an ideal signal and a received signal.

44. The method of claim 43, wherein generating a difference between an ideal signal and a received signal comprises:

demodulating the received signal;

decoding the demodulated signal;

generate the ideal signal; and

subtracting the ideal signal from the demodulated signal.

AMENDED SHEET

45. The method of claim 43, wherein generating a difference between an ideal signal and a received signal comprises:

demodulating the received signal;

decoding the demodulated signal;

generating the ideal signal with a carrier of the received signal;

subtracting the ideal signal from the received signal.

46. The method of claim 2, wherein the means for of measuring the non-linearity of the TWTA comprises:

generating a difference between an ideal signal and a received signal.

47. The method of claim 43, wherein generating a difference between an ideal signal and a received signal comprises:

demodulating the received signal;

decoding the demodulated signal;

generate the ideal signal; and

subtracting the ideal signal from the demodulated signal.

48. The method of claim 43, wherein generating a difference between an ideal signal and a received signal comprises:

demodulating the received signal;

decoding the demodulated signal;

generating the ideal signal with a carrier of the received signal;

subtracting the ideal signal from the received signal.